

Claims

1. Support structure for a retractable and extendable flap (12) associated with an object (14), surrounded by a flowing fluid, comprising a shell profile (16) that has a fluid/aerodynamic low-drag form on the outer side and on the inner side forms a chamber (18) for at least partially receiving a device (20) for retracting and extending the flap (12).
2. Support structure in accordance with claim 1, characterized in that the shell profile (16), that has a fluid/aerodynamic form on the outer side, is of two-part construction.
3. Support structure in accordance with claim 1 or 2, characterized in that the shell profile (16), that has a fluid/aerodynamic form on the outer side, includes a front shell (22) and a rear shell (24) that are arranged one behind the other against the direction of flow (arrow 26) of the fluid.
4. Support structure in accordance with claim 3, characterized in that the front shell (22) and the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, forms a fluidic unit without any additional fluid/aerodynamic flow resistance when the flap (12) is retracted.
5. Support structure in accordance with claim 3 or 4, characterized in that the front shell (22) and the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, can move relative to each other corresponding to the retracted or extended state of the flap (12).

6. Support structure in accordance with one of claims 3 to 5, characterized in that the front shell (22) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is attached to the object (14) and that the rear shell (24) is attached to the flap (12).
7. Support structure in accordance with claim 6, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are attached to the object (14) and/or the flap (12) by means of discrete or continuous fittings or similar attaching elements.
8. Support structure in accordance with claim 6 or 7, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are mounted on the object (14) and/or on the flap (12) by means of fittings or similar attaching elements of linear form and/or flat design.
9. Support structure in accordance with claim 7 or 8, characterized in that the fittings or similar attaching elements are arranged within the chamber (18) for at least partially receiving the device (20) for retracting and extending the flap (12).
10. Support structure in accordance with one of claims 3 to 9, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are of single- or multicell construction.
11. Support structure in accordance with one of claims 3 to 10, characterized in that the front shell and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are com-

pletely or partially of sandwich construction and/or composite construction.

12. Support structure in accordance with one of claims 3 to 11, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are provided with stiffeners, particularly longitudinal and/or transverse stiffeners.
13. Support structure in accordance with claim 12, characterized in that the stiffeners, particularly the longitudinal and/or transverse stiffeners, are arranged within the chamber (18) for at least partially receiving the device (20) for retracting and extending the flap (12).
14. Support structure in accordance with one of claims 3 to 13, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, consist(s) essentially of a U-shaped outer shell (34) and of the side (42) and/or inner (46) and/or intermediate walls (50) contained by the outer shell (34) and also, if necessary, a closing cover (36).
15. Support structure in accordance with one of claims 3 to 14, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are provided with at least one opening (38), that can be covered by a cover (40), for inspection, servicing and repair purposes.
16. Support structure in accordance with one of claims 3 to 15, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, each consist(s)

completely or partially of plastic, particularly fiber-reinforced plastic, and/or fiber composite material and/or metal material, particularly steel, titanium, aluminum or an alloy of same, and/or a combination of these.

17. Support structure in accordance with one of claims 3 to 16, characterized in that the front shell (22) and/or rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are provided with a coating that has an electrical conducting and/or antistatic effect.
18. Support structure in accordance with one of claims 3 to 17, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are provided with a coating that is resistant to shock and impact stresses.
19. Support structure in accordance with one of claims 3 to 18, characterized in that the front shell (22) and/or the rear shell (24) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, is/are provided with a coating that makes surface changes or damage visible.
20. Support structure in accordance with one of claims 1 to 19, characterized in that a device (20) fitted in the chamber (18) of the shell profile (16), that has a fluid/aerodynamic form on the outer side, for extending and retracting the flap (12), includes a kinematic guiding device (52) and at least partially a driving device (54).
21. Support structure in accordance with claim 10, characterized in that the kinematic guiding device (52) includes a guide rail (56) associated with the front shell (22) and

a roller carriage (58) that moves on the guide rail (56), a connecting element (60) that can be attached to the flap (12) and is attached to the roller carriage (58), and a control lever (64) that can be swivel-connected to the front shell (22) and the flap (12).

22. Support structure in accordance with claim 21, characterized in that the guide rail (56) associated with the front shell (22) is detachably connected to the front shell (22).
23. Support structure in accordance with claim 21 or 22, characterized in that the guide rail (56) associated with the front shell (22) can be connected to the front rail by means of a mechanical or form fit.
24. Support structure in accordance with one of claims 21 to 23, characterized in that the guide rail (56) associated with the front shell (22) is made of metal, particularly a high-quality material or wear-resistant steel, preferably of titanium or a titanium alloy.
25. Support structure in accordance with one of claims 21 to 24, characterized in that the driving device (54) includes a driving element (70) and a drive rod (72) that can be swivel-connected to the driving element (70) and the connecting element (60) of the flap (12).
26. Support structure in accordance with claim 25, characterized in that the driving element (70) of the driving device (54) is mounted in the front shell (22) of the shell profile (16).
27. Support structure in accordance with claim 25, characterized in that the driving element (70) of the driving device (54) can be mounted on the object (14) surrounded by the flowing fluid.

28. Support structure in accordance with one of claims 1 to 27, characterized in that at least one further device, in particular a fuel jettison system or a ram air turbine, can be installed within the chamber (18) to at least partially receive the device (20) for retracting and extending the flap (12).
29. Use of a support structure (10) in accordance with one of the preceding claims for a landing flap or trailing-edge flap mounted on a mainplane (14) of an aircraft or a similar flap of a submarine, aerospace aircraft or a flexible flow guidance device in a water/wind tunnel.